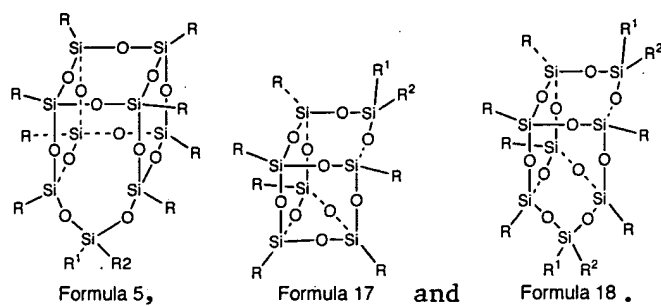


aliphatic, aromatic, olefinic, alkoxy, siloxy or H, Y is halide or amine, n is 4 – 24, m is 1 - 10 and j is 1-10 and # is the sum of the lettered substituents in said respective POSS compounds.

26. The composition of claim 25 selected from the group consisting of:



27. The composition of formula 17 as produced by the method of claim 22.

28. The composition of formula 18 as produced by the method of claim 23.

29. The composition of formula 5 as produced by the method of claim 24.

#### REMARKS

Claims 1 – 29 are in the present application, of which claims 20, 12, 16 to 29 are rejected and certain other claims are indicated allowed as will be discussed below.

The Office Action rejection of claims 10, 12 & 16 to 29 as indefinite under 35 U.S.C. 112, second paragraph, is respectfully traversed. These claims have been amended to meet the above rejection as discussed below.

Thus claims 10 & 11 have been amended to depend from claim 5 to meet the “m” units rejection and claim 5 has itself been amended, to define a conjugate base X and thus provide antecedent basis for claims 10, 11, 16 & 17.

As for claim 12, the Examiner’s suggestion is followed as indicated in the amendment of such claim.

As to the question of whether compound 7a is merely an intermediate compound or a compound in its own right, the answer is both, see Example 1 hereof.

As to claim 18, it has been narrowed by the above amendment to where the OH groups are in the exo-stereochemical position, as further discussed below. Also the phrase "when said compound has at least three open rings" has been moved to the end of claim 18, to indicate that it modifies all of the bases listed before it.

As to claims 19 & 26, these have been written in more conventional form as indicated. Also in claim 19, of the four compounds so listed, the first is found in claim 18 and the other three are found listed in claim 5.

Claim 23 has been objected to, as having four OH groups while claim 20, from which it depends, recited that m could be 1 – 2. This has been corrected by the recitation that  $m = 1-10$ , in claim 20, as amended, and this objection is believed met.

By thus broadening, the definition of "m," claims 22 – 24 become narrowing method claims and properly dependent upon claim 20.

As for claims 27 – 29, these claims have been re-written per the Examiner's suggestion as product-by-process claims as indicated.

The Office Action rejection of claims 18 & 19 as anticipated under 35 U.S.C. 102 (b) or (e) by Lichtenhan et al '867 or Banaszak Holl et al is respectfully traversed. At the time of filing of these references, only the endo stereochemical position of the conjugate base substituent on the POSS compound was known, i.e., that of formula 13a of claim 17. Claim 18, as amended, relates to the new exo stereochemical position of the base substituents on the POSS compound, e.g., that of formula 13 b of claim 17. Thus claim 18, as amended, is believed distinguished over the above two cited references.

The Office Action rejection of claims 20, 21 & 25 as anticipated under 35 U.S.C. 102(b) or obvious under 35 U.S.C. 103(a) over Lichtenhan et al, '562, is respectfully traversed. All that

the '562 process was capable of, was installing a single 'R' substituent on a corner of the cage molecule, that is, a silsesquioxane substituent.

However, applicants method per claim 20, substitutes two 'R' reagents on a corner of a POSS molecule, e.g., a silicon substituent, as illustrated in claims 22, 23 & 24 hereof. Thus it is believed that Applicants' method, per claim 20, is inherently distinct from the '562 process, which could not produce an expanded ring having Applicants' double R substituent. Accordingly it is believed that claim 20, as amended and its dependent claims 21 – 24, define a distinct method over the applied art.

It is noted that claims 1 – 9, 11 & 13 – 15 are indicated allowed in the above Office Action.

In view of the foregoing, the claims of record, as amended, are believed distinguished over the applied art and in condition for allowance. Early notice of allowance is requested.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that a call may be deemed desirable by the Examiner: Thomas C. Stover (781) 377-3779.

Respectfully submitted,



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THOMAS C. STOVER  
Attorney for Applicant(s)

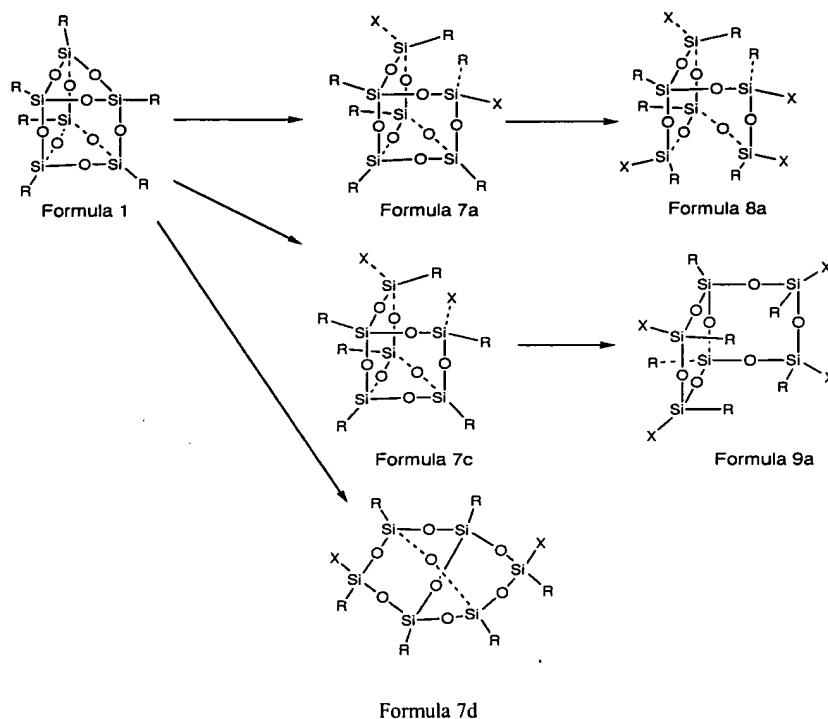
Amend or rewrite the following claims.

5.(Twice Amended) A method for selectively opening the rings in POSS compounds to form functionalized POSS derivatives comprising, reacting  $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ ,  $[(\text{RSiO}_{1.5})_n(\text{R}^3\text{SiO}_{1.5})_m]_{\Sigma\#}$  or  $[(\text{RSiO}_{1.5})_n(\text{R}^1\text{R}^2\text{SiO}_{1.0})_m]_{\Sigma\#}$  with a strong acid to form said derivatives, having a conjugate base X, which base is F, OH, SH, NHR, NR<sub>2</sub>, ClO<sub>4</sub>, SO<sub>3</sub>CH<sub>3</sub>, SO<sub>3</sub>CF<sub>3</sub>, SO<sub>3</sub>OH, SO<sub>3</sub>Cl, SO<sub>3</sub>CH<sub>3</sub>, NO<sub>3</sub>, PO<sub>4</sub> or Cl, where n is 6-12, m is 1-10, where R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are different substituents than R which are all selected from the group consisting of [ ] aliphatic, aromatic, olefinic, alkoxy, siloxy and H and where # is the sum of the lettered substituents in said POSS compound.

10. (Amended) The method of claim [3] 5 wherein  $[(\text{RSiO}_{1.5})_n(\text{R}^3\text{SiO}_{1.5})_m]_{\Sigma\#}$  is reacted with said acid to form  $[(\text{RSiO}_{1.5})_6(\text{R}^3\text{XSiO}_{1.0})_1(\text{RXSiO}_{1.0})_1]_{\Sigma 8}$ , where R<sup>3</sup> is of the same group as R but is a different substituent and # is m + n.

11. (Amended) The method of claim [3] 5 wherein  $[(\text{RSiO}_{1.5})_7(\text{R}^3\text{SiO}_{1.5})_1]_{\Sigma 8}$  is reacted with said acid to form  $[(\text{RSiO}_{1.5})_4(\text{RXSiO}_{1.0})_3]$  and R<sup>3</sup> is of the same group as R but is a different substituent.

12. (Twice Amended) The method of claim 3 wherein the compound of formula 1 is reacted with said acid to form [a compound of the following formulas] a compound selected from the formulas 7a, 8a, 7c, 9a or 7d as follows:



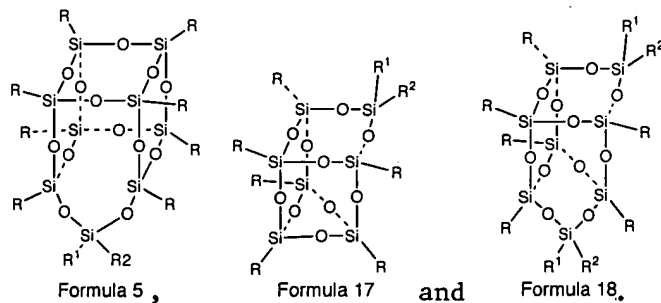
18. (Twice Amended) A polyhedral oligomeric silsesquioxane (POSS) compound of the formula,  $[(\text{RSiO}_{1.5})_n(\text{RXSiO}_{1.0})_m]_{\Sigma\#}$ , where  $n$  is 4-24,  $m$  is 1-10,  $R$  is aliphatic, aromatic, olefinic, alkoxy, siloxy or H and  $X$  is the conjugate base of an acid, which base is of F, OH, [when said compound has at least three open rings] when the OH groups are in an exo-stereochemical position, SH, NHR or NR<sub>2</sub>, ClO<sub>4</sub>, SO<sub>3</sub>OH, SO<sub>3</sub>CF<sub>3</sub>, SO<sub>3</sub>Cl, SO<sub>3</sub>CH<sub>3</sub>, NO<sub>3</sub>, or PO<sub>4</sub>, when said compound has at least three open rings.

19. (Amended) The POSS compound of claim 18 selected from the group consisting of [all formulas 7-16 above]  $[(\text{RSiO}_{1.5})_n(\text{RXSiO}_{1.0})_m]_{\Sigma\#}$ ,  $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ ,  $[(\text{RSiO}_{1.5})_n(\text{R}^3\text{SiO}_{1.5})_m]_{\Sigma\#}$ ,  $[(\text{RSiO}_{1.5})_n(\text{R}^1\text{R}^2\text{SiO}_{1.0})_m]_{\Sigma\#}$ .

20. (Twice Amended) A method for expanding rings in polyhedral oligomeric silsesquioxane (POSS) compounds comprising, reacting  $[(\text{RSiO}_{1.5})_n(\text{R}(\text{HO})\text{SiO}_{1.0})_m]_{\Sigma\#}$  with  $\text{Y}_2\text{SiR}^1\text{R}^2$  silane

reagents to obtain at least one expanded POSS ring in  $[(\text{RSiO}_{1.5})_{n+m}(\text{R}^1\text{R}^2\text{SiO}_{1.0})_j]_{\Sigma\#}$ , where R,  $\text{R}^1$  and  $\text{R}^2$  are aliphatic, aromatic, olefinic, alkoxy, siloxy or H, Y is halide or amine, n is 4 – 24, m is [1-2] 1-10 and j is 1-10 and # is the sum of the lettered substituents in said respective POSS compounds.

26. (Amended) The composition of claim 25 selected from the group consisting of [formulas 17, 18, & 5 above.]:



27. (Amended) The composition of formula 17 [shown in claim 22] as produced by the method of claim 22.

28. (Amended) The composition of formula [17 shown in claim 23] 18 as produced by the method of claim 23.

29. (Amended) The composition of formula [25 shown in claim 24] 5 as produced by the method of claim 24.